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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/056,770	01/24/2002	Gottfried Ferber	WMP-EUP-008	4597

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EXAMINER
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TRAN, LONG K

ART UNIT	PAPER NUMBER
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2818

DATE MAILED: 09/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/056,770

Applicant(s)

FERBER ET AL.

Examiner

Long K. Tran

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on Amdt A on June 27, 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3 and 5-13 is/are pending in the application.
- 4a) Of the above claim(s) 12 and 13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 3 and 5-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. This office action is in response to Amendment filed on June 27, 2003
2. Claim **4** has been cancelled in Paper No. **10**.
3. Claim **1** has been amended in Paper No. **10**.
4. Claims **12** and **13** have been withdrawn added in Paper No. **10**.
5. Claims **1, 2, 3** and **5 – 11** are presented for examination.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims **1, 2, 5** and **8** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidt et al. (US Patent No. 5,721,044) in view of Miyahara (US Patent No. 5,629,559).

Regarding claim **1**, Schmidt et al. disclose a substrate body having and insulating ceramic layer 1 with a top side, and a metal layer 6 fixedly joined to the top side of the insulating ceramic layer, the substrate body being one of a direct copper bonded (DCB) substrate and an active metallic brazed (AMB) substrate; at least one semiconductor component disposed directly on the substrate body facing the metal layer (col.2, lines 38+; col. 3, lines 35+). Schmidt et al. fail to teach connection conductor laser welded to the metal layer. However, Miyahara teach conventional electrical welding, laser welding,

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soldering, brazing, pressure bonding have been used to connect power layer and ground layer to the leads of lead frame in the semiconductor device (col. 14, lines 44 – 54). It is noticed that the claim language does not specify what kind of connection conductor is laser-welded power and ground layers are connection conductors. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the conventional laser welding method as mentioned by Miyahara for the connection between conductor and metal layer of Schmidt, in order to take advantage of coupling laser energy to the bond without substantially heating the device for providing a stable fastening in a manner other than by gluing.

In an addition, this limitation “laser-welded” is taken to be a product by process limitation, it is the patentability product and not of recited process steps which must be established. Therefore, when the prior art discloses a product which reasonably appears to be identical with or only slightly different than the product claimed in a product-by process claim, a rejection based on sections 102 or 103 is fair. A product by process claim directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See In re Fessman, 180 USPQ 324,326(CCPA 1974); In re Marosi et al., 218 USPQ 289,292 (Fed. Cir. 1983); and particularly In re Thorpe, 227 USPQ 964,966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product “gleaned” from the process steps, which must be determined in a “product by process” claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claim in “product by process” claim or not.

Regarding claims **2** and **5**, Schmidt et al. disclose the ceramic layer 1 is formed of  $\text{Al}_2\text{O}_3$  or AlN (col. 2, lines 48 – 53).

Regarding claims **3** and **7**, Schmidt et al. disclose copper or copper alloy is used for connection element 6, printed conductors 7, contact surfaces 8 and metal surfaces 9, 11, 13 and 16 (co. 3, lines 55 – 61).

Regarding claim **8**, Schmidt et al. disclose a metal coating provided on surface of metal layer (abstract).

8. Claims **1** and **9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Stoisiek et al. (US Patent No. 6,310,401) in view of Miyahara (US Patent No. 5,629,559).

Regarding claim **1**, figures 1 – 3 in Stoisiek et al. illustrate a semiconductor module comprising: a substrate body having an insulating ceramic layer 1 with a top side 21, and a metal layer 2 fixedly joined to the top side of the insulating ceramic layer; at least one connection conductor 13 joint to the metal layer 2. Stoisiek et al. fail to teach connection conductor laser welded to the metal layer. However, Miyahara teach conventional electrical welding, laser welding, soldering, brazing, pressure bonding have been used to connect power layer and ground layer to the leads of lead frame in the semiconductor device (col. 14, lines 44 – 54). It is noticed that the claim language does not specify what kind of connection conductor is laser-welded power and ground layers are connection conductors. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the conventional laser welding

method as mentioned by Miyahara for the connection between conductor and metal layer of Schmidt, in order to take advantage of coupling laser energy to the bond without substantially heating the device for providing a stable fastening in a manner other than by gluing.

In an addition, this limitation "laser-welded" is taken to be a product by process limitation, it is the patentability product and not of recited process steps which must be established. Therefore, when the prior art discloses a product which reasonably appears to be identical with or only slightly different than the product claimed in a product-by process claim, a rejection based on sections 102 or 103 is fair. A product by process claim directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See *In re Fessman*, 180 USPQ 324,326(CCPA 1974); *In re Marosi et al.*, 218 USPQ 289,292 (Fed. Cir. 1983); and particularly *In re Thorpe*, 227 USPQ 964,966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps, which must be determined in a "product by process" claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claim in "product by process" claim or not.

Regarding claim 9, Stoisiek et al. disclose the connection conductor has a foot which is bent at the right angle (fig. 2).

9. Claims **10** and **11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Stoisiej et al. (US Patent No. 6,310,401) in view of Miyahara (US Patent No. 5,629,559) and further in view of Crowley et al. (US Patent No. 6,521,982).

Regarding claim **10**, Stoisiej et al. and Miyahara disclose the claimed invention in claims 1 and 9 but fail teach the foot of connection connector has at least one slot formed therein as in claim 10.

However, Crowley et al. disclose a foot of connection connector 132 (figs. 5 and 6) has slot 144.

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to make a slot at the foot of the connection connector as taught by Crowley et al. into Stoisiej et al. device in order to augment the resistance of the connection to shear tresses (Crowley et al. Col. 6, line 16 – 21).

Regarding claim **11**, Stoisiej et al. and Miyahara disclose the claimed invention in claims 1, 9 and 10 but fail teach the slot having width that is approximately equal to thickness of the foot as in claim 11.

However, figure 6 in Crowley et al. illustrates slot 144 is approximately equal to thickness of the foot part of connection connector 132.

It would have been an obvious matter of design to make a slot having width equal to the thickness of the foot part of the connection connector as taught by Crowley into Stoisiej et al. device, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. Furthermore, since applicant has not disclosed that the width of slot solves any stated problem or is for any particular

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purpose and it appears that the invention would perform equally well with foot part of Stoisiek et al. device.

10. Claims **1, 2, 3, 5, 6** and **7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Choi (US Patent. No. 6,404,065) in view of Miyahara (US Patent No. 5,629,559)

Regarding claim **1**, figure 2 in Choi illustrates a semiconductor module comprising: a substrate body 28 having an insulating ceramic layer 32 with a top side, and a metal layer 30 fixedly joined to the top side of the insulating ceramic layer; at least one connection conductor 38 joint to the metal layer 30. Choi fails to teach connection conductor laser welded to the metal layer. However, Miyahara teach conventional electrical welding, laser welding, soldering, brazing, pressure bonding have been used to connect power layer and ground layer to the leads of lead frame in the semiconductor device (col. 14, lines 44 – 54). It is noticed that the claim language does not specify what kind of connection conductor is laser-welded power and ground layers are connection conductors. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the conventional laser welding method as mentioned by Miyahara for the connection between conductor and metal layer of Schmidt, in order to take advantage of coupling laser energy to the bond without substantially heating the device for providing a stable fastening in a manner other than by gluing.



In an addition, this limitation "laser-welded" is taken to be a product by process limitation, it is the patentability product and not of recited process steps which must be established. Therefore, when the prior art discloses a product which reasonably appears to be identical with or only slightly different than the product claimed in a product-by process claim, a rejection based on sections 102 or 103 is fair. A product by process claim directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See *In re Fessman*, 180 USPQ 324,326(CCPA 1974); *In re Marosi et al.*, 218 USPQ 289,292 (Fed. Cir. 1983); and particularly *In re Thorpe*, 227 USPQ 964,966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps, which must be determined in a "product by process " claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claim in "product by process" claim or not.

Regarding claim **2**, Choi discloses the insulating ceramic layer of the substrate body is formed of  $\text{Al}_2\text{O}_3$  (col. 3, lines 39 – 48).

Regarding claim **3**, Choi discloses the metal layer is made of copper (col. 3, lines 30 – 34).

Regarding claims **5** and **6**, Choi discloses the insulating ceramic layer contains AlN or BeO (col. 3, lines 41 – 44).

Regarding claim **7**, Choi discloses the connector 28 is one of a plurality of connection conductors each formed of copper (col.4, lines 16 and 17). It is noted that connector 28 is part of copper lead frame 54 as illustrated in figure 4.

***Response to Arguments***

11. Applicant's arguments with respect to claims **1, 2, 3, 5 – 11** have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Farnworth et al. (US Patent No. 6,020,629) and Suzuki (US Patent 5,877,550) disclose a semiconductor device and method similar to that of Schmidt et al. (US Patent No. 5,721,044), Stoisiek et al. (US Patent No. 6,310,401), Miyahara (US Patent No. 5,629,559), Crowley et al. (US Patent No. 6,521,982) and Choi (US Patent. No. 6,404,065).

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long K. Tran whose telephone number is 703-305-5482. The examiner can normally be reached on Mon-Thu.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 703-308-4910. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-3329.

Long Tran 

August 15, 2003

  
David Nelms  
Supervisory Patent Examiner  
Technology Center 2800